



ARI NEWSLETTER

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A SOFTWARE TOOL FOR PREDICTING LIVE-FIRE PERFORMANCE FROM DEVICE-BASED PERFORMANCE¹

Using devices to predict live-fire performance and cut the cost of soldier training and evaluation.

In the Spring 1998 Newsletter, we proposed a strategy for enabling Army National Guard (ARNG) armor unit trainers to complete the device-based portion of their tank gunnery training program in just three drill weekends. Trainers could then predict which of their crews would be 1st-run qualifiers on Tank Table VIII (TTVIII). What made this strategy work was a look-up table that predicted TTVIII gunnery scores from those fired on a training device called the Conduct-of-Fire Trainer (COFT).

Recently, the ARNG asked us to go a step farther by giving unit trainers the capability to develop their own look-up prediction tables for devices besides COFT, and live-fire evaluation events as well as TTVIII. In response to this request, we developed an easy-to-use tool that provides this added capability.

THE TOOL

The tool is a software program designed to run in a Windows 3.1 or

95/98 environment. It can calculate predictions for any live-fire evaluation event that is simulated on a training device, provided the same scoring procedure is applied to each. Once the device and live-fire scores are entered, the tool automatically calculates the desired predictions with the click of a button and saves them for future reference.

HOW DOES IT WORK?

The steps needed to create, view, interpret, and use the tool's predictions are listed under the main menu options shown in Figure 1. One simply clicks on the desired option to enter or obtain the information requested. It's that easy.

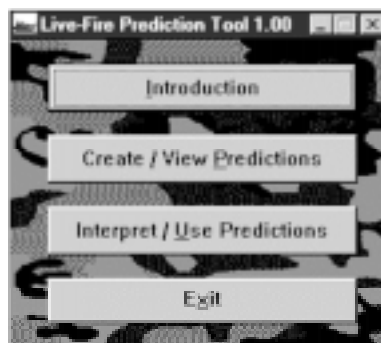


Figure 1

Clicking on the "Introduction" button provides (a) guidance on the kinds of device and live-fire data

Inside

A Software Tool For Predicting Live-fire Performance From Device-Based Performance 1

Director's Message 2

Leaders' Guide for Contingency Operations: The Human Dimension 5

The Elements of Training Evaluation 9

Think Like a Commander 11

Telephone Directory 15

¹ From Hagman, J. D. (1998, September-October). You asked, we listened: A software tool for predicting live-fire scores from device-based scores, *Armor*, CVII(5), 28-29.

Visit website
<http://www.ari.army.mil>

that need to be collected and then entered, (b) tips on how to collect these data for best results, and (c) helpful hints on how to navigate successfully through the program. Clicking on the “Create/View” button leads to the “Prediction Log” screen, shown in Figure 2, where results are stored for permanent access.

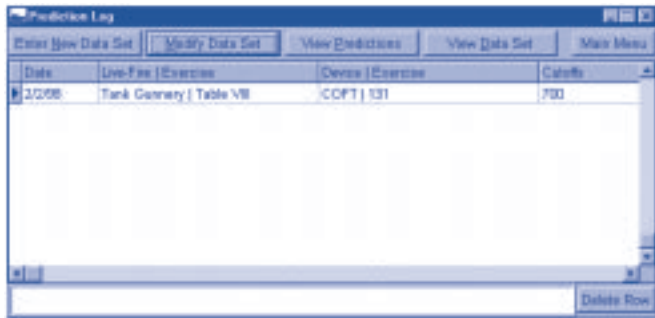


Figure 2

Clicking on the “Prediction Log” screen’s “Enter New Data Set” button leads to the “Enter Scores” screen, shown in Figure 3, where the collected device and live-fire data, as well as supplemental information needed for data set identification, are entered. Identifying information includes the category of live fire to be predicted (e.g., tank gunnery, rifle marksmanship), the live-fire event scores to be predicted (e.g., TTVIII, record fire), the training device used for prediction (e.g., COFT, Engagement Skills Trainer[EST]), the device exercise scores from which predictions will be based (e.g., COFT advanced matrix exercise 131, EST simulated record fire exercise), the cutoff score(s) against which predictions will be calculated (e.g., 700 for TTVIII qualification, 26 for record fire qualification), the maximum possible live-fire score (e.g., 1,000 on TTVIII, 40 on record fire), and specific unit/range information.

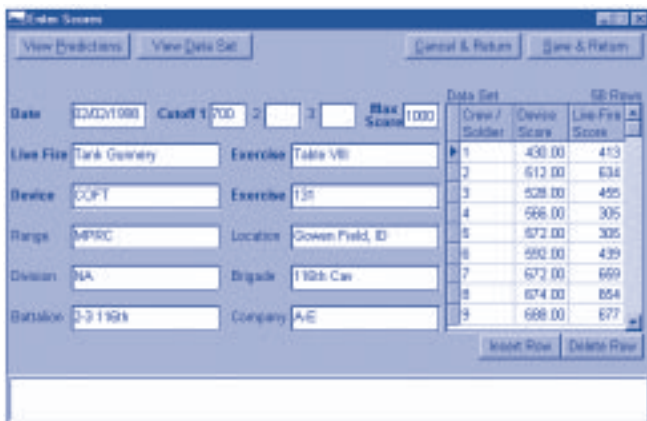


Figure 3

Once data entry is complete, clicking on the “View Predictions” button displays the desired predictions in tabular format like that shown in Table 1 for TTVIII gunnery. Column 1 shows a range of possible devices (i.e., COFT) scores. Column 2 shows the predicted average live-fire score for each device score listed. Column 3 shows the predicted 1st-run chances of firing at or above the live-fire cutoff score (i.e., 700) entered earlier for TTVIII qualification.

Date: 2/2/98
Range: MPRC
Location: Gowen Field, ID
Division: N/A
Brigade: 116th Cav
Battalion: 2-3 116th
Company: A-E

Predictions of 1st-Run Live-Fire Scores on Tank Gunnery / Table VIII From Device-Based Scores on COFT / Exercise 131

Device Score	Predicted Average Live-Fire Score	Chances (%) of a Live-Fire Score \geq 700
541	543	10
616	595	20
674	636	30
721	669	40
765	700	50
809	731	60
856	764	70
914	805	80
989	857	90

Table 1

Lastly, clicking on the main menu’s “Interpret/Use Predictions” button provides guidance on how to do just that for the predictions provided. Using the sample prediction table shown in Table 1, for instance, it would be predicted that a tank crew with a COFT score of 765 will on the average fire 700 on TTVIII and have a 50% chance of successful 1st-run qualification. A tank crew with a COFT score of 856 will on the average fire 764 and have a 70% chance of successful 1st-run qualification, and so forth.

WHAT'S THE PAYOFF

The resulting predictions now allow ARNG unit trainers to do things they haven't been able to do before. First they can predict soldier/crew, 1st-run, live-fire performance on their range(s) from performance obtained on their device(s). Second they can schedule device-based training more efficiently by targeting only those soldiers/crews in need of remediation (i.e., those not meeting the device-based live-fire expectancy standard [e.g., 70%] set by the unit commander for 1st-run qualification). Third, they can identify when their soldiers/crews have received enough device-based training (i.e., when they've met this expectancy standard). And lastly, they can save ammunition by allowing only those soldiers/crews ready for successful live-fire evaluation to proceed to the range.

Although we've developed the prediction tool for use by the ARNG, Active Component (AC) unit trainers might find it useful as well. In the months to come, we'll be conducting the research needed to assess the validity of this notion. In the meantime the interested reader can download a copy of the prediction tool software program off ARI's website @www-ari.army.mil by clicking on "Highlights" and then on "Predicting Live-Fire Performance."

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Dr. Charles Moskos, presenting initial findings of research working a number of issues with various HQDA elements and DoD organizations.

The S.L.A. Marshall Chair

Dr. Charles Moskos is professor of sociology at Northwestern University in Evanston, Illinois. He is a leading figure in military sociology. His most recent book, "All We Can Be: Black Leadership and Racial Integration the Army Way," examines race relations in the military.

Dr. Moskos occupies the S.L.A. Marshall 1999 Research Chair at ARI. The Chair was established to build bridges between the military research community and the academic world. The S.L.A. Marshall Research Chair symbolizes the importance of the human dimension into the systematic consideration of military effectiveness.